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MACROECONOMIC INFLUENCES ON THE INDIAN RUPEE: AN ANALYSIS OF EXCHANGE RATE DYNAMICS FROM 2001 TO 2018

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ABSTRACT

India's economy experienced significant transformations between 2001 and 2018, marked by robust GDP growth, fluctuating exchange rates, and varying macroeconomic conditions. This study examines the interactions among key macroeconomic variables, including the exchange rate (ER), real GDP, lending rates, the Index of Industrial Production (IIP), the Consumer Price Index (CPI), and foreign exchange reserves (FER). Utilizing data from this period, the study explores how these variables influence the exchange rate and overall economic stability. The findings highlight the significant impact of inflation and foreign exchange reserves on the exchange rate. A 1% increase in CPI is associated with a 1.027% depreciation of the INR, while a 1% rise in FER leads to a 0.318% appreciation of the currency. These results underscore the importance of effective inflation control measures and strategic management of foreign reserves in maintaining currency stability. The study also discusses the complex interplay between lending rates, industrial production, and economic growth, providing insights for policymakers to ensure sustainable economic development.

KEYWORDS: Foreign Exchange Determination, IIP, CPI, Lending Rate, Foreign Exchange Reserves and OLS.

INTRODUCTION

India's economy, one of the fastest-growing in the world, has experienced significant transformations over the past two decades. This period, from 2001 to 2018, witnessed substantial shifts in key macroeconomic variables including the foreign exchange rate (ER), real Gross Domestic Product (GDP), lending rates, the Index of Industrial Production (IIP), the Consumer Price Index (CPI), and foreign exchange reserves (FER). Understanding the interactions among these variables is crucial for comprehending the broader economic dynamics and formulating effective policy interventions.

From 2001 to 2018, India's real GDP showed robust growth, averaging around 7% per annum, placing it among the top-performing emerging markets. In 2001, India's GDP stood at approximately $476 billion, and by 2018, it had surged to nearly $2.7 trillion. This impressive growth was driven by a combination of factors including liberalization reforms, increased foreign direct investment (FDI), and a burgeoning service sector.

The Indian Rupee (INR) experienced considerable fluctuations against major currencies, particularly the US Dollar (USD), during this period. In 2001, the INR/USD exchange rate was approximately 48.4, and by 2018, it had depreciated to around 69.8. This depreciation was influenced by a variety of factors including trade deficits, inflation differentials, and capital flow volatility. The depreciation of the INR played a crucial role in affecting trade competitiveness and inflation.

Lending rates in India saw significant variations, primarily influenced by the Reserve Bank of India's (RBI) monetary policy adjustments aimed at controlling inflation and stimulating growth. In the early 2000s, lending rates were relatively high, with average rates around 12-14%. By 2018, these rates had moderated to around 8-9%, reflecting the RBI's accommodative stance to support economic growth amidst global economic uncertainties.

The Index of Industrial Production (IIP) is a critical indicator of the industrial sector's health. From 2001 to 2018, India's IIP demonstrated notable growth, although with periods of volatility due to global financial crises and domestic structural challenges. The IIP grew from a base value of 100 in 2004-05 to around 145 by 2018, indicating substantial industrial expansion but also reflecting cyclical downturns.

Inflation, as measured by the CPI, remained a significant macroeconomic challenge for India. CPI inflation varied widely, peaking at around 12% in the aftermath of the global financial crisis (2008-2009) before stabilizing to around 3-4% by 2018 due to effective monetary policy measures and lower global oil prices. Inflation dynamics were influenced by food prices, energy costs, and supply chain constraints.

India's foreign exchange reserves witnessed remarkable growth, reflecting improved external sector stability and increased capital inflows. In 2001, reserves were approximately $42 billion, and by 2018, they had soared to over $400 billion. This accumulation was driven by robust FDI, portfolio investments, and remittances, providing a buffer against external shocks and enhancing investor confidence.

The relationship between real GDP growth and the exchange

rate is multifaceted. A depreciating rupee often boosts export competitiveness, which can enhance GDP growth by driving higher export volumes. For instance, during periods of significant rupee depreciation (such as 2013), India's export sectors, particularly IT services and textiles, saw increased demand. However, a weaker currency also raises the cost of imports, contributing to inflationary pressures, which can dampen domestic consumption and investment, thus moderating GDP growth.

Lending rates have a direct impact on investment and consumption, key components of GDP. Lower lending rates reduce borrowing costs, encouraging businesses to invest and consumers to spend, thereby stimulating economic growth. The RBI's rate cuts post-2008 financial crisis aimed to revive economic activity, which helped India maintain relatively high growth rates during global economic downturns. Conversely, higher lending rates, often used to combat inflation, can slow down economic growth by increasing the cost of credit.

The exchange rate significantly influences industrial production. A weaker rupee makes Indian goods cheaper on the international market, boosting industrial output, especially in export-oriented industries. However, it also raises the cost of imported inputs and machinery, which can constrain production if industries heavily rely on these imports. For instance, the depreciation of the rupee in 2013 had a dual impact: while exports grew, industries dependent on imported raw materials faced higher costs.

There is a critical interplay between CPI and lending rates. Higher inflation (CPI) typically prompts the central bank to raise lending rates to curb excessive demand and price growth. This was evident during the high inflation period of 2008-2009, when the RBI increased rates to manage inflation expectations. Conversely, lower inflation allows for more accommodative monetary policies, supporting economic growth by reducing the cost of borrowing.

Foreign exchange reserves play a pivotal role in stabilizing the exchange rate. Adequate reserves enable the RBI to intervene in the forex market to smooth out excessive volatility and maintain investor confidence. For example, during the 2013 currency crisis, the RBI used its reserves to stabilize the rupee, preventing a further sharp depreciation and restoring market stability. Accumulating reserves also reflects strong external sector performance and robust capital inflows, reinforcing economic stability.

Higher foreign exchange reserves are often associated with stronger economic performance. They provide a cushion against external shocks, ensuring that the country can meet its international obligations even during adverse global conditions. The substantial increase in India's reserves between 2001 and 2018 enhanced its economic resilience, attracting more foreign investment and contributing to sustained GDP growth.

Industrial production affects the CPI through supply-side dynamics. Higher industrial output can alleviate supply constraints, reducing price pressures and helping control inflation. However, if industrial growth is accompanied by increased demand for raw materials and energy, it can drive up input costs, contributing to higher CPI. The interplay between industrial production and inflation was particularly evident during periods of rapid industrial expansion, which sometimes led to short-term inflation spikes due to supply bottlenecks.

From 2001 to 2018, India's macroeconomic variables exhibited complex interactions that shaped the country's economic landscape. The dynamics between the foreign exchange rate, real GDP, lending rates, the Index of Industrial Production, the Consumer Price Index, and foreign exchange reserves illustrate the interconnected nature of economic policy and performance. Understanding these relationships is essential for effective economic management and policy formulation, ensuring sustainable growth and stability in the face of both domestic and global challenges. As India continues to evolve as a major global economy, these insights will remain crucial for navigating future economic landscapes.

REVIEW OF LITERATURE

Numerous research works have investigated the factors that influence the exchange rate in India. Ghosh (2007) discovered that macroeconomic factors like inflation and exchange rate volatility have an impact on the exchange rate pass-through into India's consumer pricing index. Key drivers that Jain (2012) identified were foreign exchange reserves, the money supply, call and bank rates, inflation differentials, the index of industrial production, and yield differentials.

Suthar (2008) went on to highlight the exchange rate-influencing effects of foreign currency reserves, interest yield differentials, and bank rate policy. All of these studies demonstrate how intricately different factors interact to determine India's currency rate. While Dua (2002) highlighted the influence of both domestic and external factors on interest rates. These findings suggest that lending rates, particularly the bank rate, play a crucial role in determining exchange rates in India.

Maskay (2001) identified that an increase in the money supply tends to depreciate the currency. This is consistent with the quantity theory of money, which states that increasing the money supply, if not matched by output growth, leads to inflation and thus currency depreciation. Inflation was another key factor influencing the foreign exchange rate, as per Maskay's findings. Higher inflation in Nepal relative to its trading partners led to a depreciation of the rupee. This is in line with PPP (Purchasing Power Parity) theory, which posits that exchange rates adjust to offset changes in relative price levels between countries. Interest rates also play a critical role. Maskay (2001) observed that higher interest rates attract foreign capital, leading to an appreciation of the domestic currency. Conversely, lower interest rates tend to result in depreciation due to capital outflows seeking higher returns elsewhere. National income affects the demand for imports and foreign currencies. Maskay's analysis indicated that higher national income leads to increased import demand, putting downward pressure on the currency. This relationship underscores the complex interplay between domestic economic

performance and exchange rate movements.

Adhikari 2018 used the OLS (Ordinary Least Squares) method to study how the Nepalese rupee's decrease in value affected the country's trade deficit. His research showed that when the rupee's value decreased, the trade deficit also decreased. This is because when a currency depreciates, it makes exports cheaper and imports more expensive. As a result, this could potentially increase the amount of goods exported while decreasing the amount of goods imported. This finding is consistent with the traditional J-curve theory, which suggests that after a currency depreciation, a country's trade balance may initially worsen but eventually improve as export levels go up and import levels decrease. Both Bhattacharya (2008) and Sohrabji (2011) contribute to the understanding of ERPT (Exchange Rate Pass-through) by highlighting its incomplete nature and its growing significance in inflation dynamics. The incomplete pass-through observed by Bhattacharya suggests that firms absorb part of the exchange rate changes through adjustments in profit margins and pricing strategies. This has implications for trade policy and competitiveness, as well as for monetary policy, which must account for these mitigating factors when targeting inflation.

Sohrabji's findings on the increasing importance of exchange rates in determining the CPI (Consumer Price Index) emphasize the need for updated economic models and more nuanced policy frameworks. As global supply chains become more interconnected and the import content of consumer goods rises, the direct impact of exchange rate changes on consumer prices becomes more pronounced, requiring central banks to adapt their strategies accordingly. Empirical studies, such as those by Taylor and Taylor (2004), found mixed support for PPP, particularly in the short run, due to market imperfections and transaction costs.

The IRP (Interest Rate Parity) condition suggests that differences in interest rates between two countries will be offset by changes in the exchange rate. Research by Chinn and Meredith (2004) provided evidence that while IRP holds in the long term, short-term deviations are common due to speculative capital flows and other factors. Studies like those by Mark (2001) and MacDonald and Taylor (2003) highlighted the importance of relative money supplies and income levels in determining exchange rates. However, they also noted the limitations of these models in explaining short-term exchange rate movements. These models incorporate the role of assets and liabilities in different currencies.

Research by Hau and Rey (2006) underscored the influence of international capital flows and investors' risk preferences on exchange rates. Studies by Lane and Milesi-Ferretti (2004) demonstrated that higher economic growth and productivity gains lead to currency appreciation, as they attract foreign investment and increase demand for the domestic currency. Research by Rogoff (2002) confirmed that countries with higher inflation rates tend to experience currency depreciation, consistent with the PPP theory. Empirical evidence, such as that by Clarida and Gali (2005), supported the notion that higher interest rates attract foreign capital, leading to currency appreciation. However, the relationship is often influenced by expectations of future monetary policy.

Studies like those by Lyons (2001) emphasized the impact of order flow and market liquidity on short-term exchange rate dynamics. These studies highlighted that exchange rates are not solely driven by macroeconomic fundamentals but also by the trading behavior of market participants. Research by Barberis and Thaler (2003) introduced behavioral factors such as investor sentiment, overreaction, and herding behavior as significant determinants of exchange rates. These factors often lead to deviations from fundamental values. The 2008 global financial crisis and subsequent eurozone crisis had profound effects on exchange rates.

Studies by Obstfeld and Rogoff (2009) highlighted how crisis-induced capital flows and changes in risk perception led to significant currency fluctuations. For commodity-exporting countries, fluctuations in global commodity prices were found to have a direct impact on exchange rates. Chen and Rogoff (2003) showed that currencies of commodity exporters tend to move in tandem with global commodity price trends.

Despite extensive research on the determinants of exchange rates in India, significant gaps remain in understanding the comprehensive impact of macroeconomic variables on the exchange rate over extended periods, particularly during times of significant economic transformation. Existing studies often focus on isolated factors such as inflation, foreign exchange reserves, and interest rates without adequately capturing the interplay between these variables and other critical economic indicators like GDP, lending rates, and industrial production. For instance, while Ghosh (2007) and Jain (2012) examined the impact of specific macroeconomic variables on exchange rates, they did not account for the dynamic interactions among these variables over time. Similarly, studies like those by Maskay (2001) and Adhikari (2018) provided insights into the effects of money supply and trade deficits on exchange rates but did not consider the broader economic context.

Furthermore, much of the existing literature relies on short-term analysis, which may not capture the long-term trends and structural changes in the economy. The evolving nature of India's economy, characterized by rapid GDP growth, significant policy reforms, and fluctuating industrial output, necessitates a more holistic approach to understanding exchange rate dynamics. Additionally, the period from 2001 to 2018 saw significant shifts in global economic conditions, including the 2008 financial crisis, which likely influenced the relationships between macroeconomic variables and exchange rates.

This study aims to address these gaps by employing an ordinary least squares (OLS) approach to analyze the long-term impacts of a comprehensive set of macroeconomic variables on the exchange rate in India. By incorporating variables such as GDP, lending rates, industrial production, CPI, and foreign exchange reserves, this research seeks to provide a more nuanced understanding of how these factors collectively influence the

exchange rate. The findings will contribute to the literature by offering insights into the complex interactions among these variables and their implications for policy formulation and economic stability. This study's comprehensive approach will help stakeholders better understand the broader economic dynamics at play, ultimately aiding in the development of more effective monetary and fiscal policies.

RESEARCH METHODOLOGY

Objective of the Study

1. Examine the Determinants of the Exchange Rate in India
2. Analyze the Relationship between Exchange Rate and Inflation

Data Source

The data for the study is fetched from RBI database, India, for the macroeconomic variables such as foreign exchange rate, Real GDP, Trade Balance, Foreign Exchange reserves, Consumer Price Index, Index of industrial Production and Lending Rates over a period from 2001 to 2018.

Methodology

The data has been considering at constant price to the base year 2011-12. The data has been normalized to base year 2011-12. Later the data was converted from level form to logarithmic form to make it easier to handle with linear regression models, to stabilize the variance of a time series, especially when the data exhibits heteroscedasticity, to make these series more normally distributed, plus the coefficients in the regression can be interpreted as elasticities and also it helps reduce the influence of outliers. Further, the model is specified as below:

$$\ln(ER)=\beta_0+\beta_1.\ln(\text{GDP})+\beta_2.\ln(TB)+\beta_3.\ln(FER)+\beta_4.\ln(CPI)+\beta_5.\ln(LR)+\beta_6.\ln(IIP)+\epsilon \quad \ldots\ldots\ldots(1)$$

This equation specifies that the exchange rate is a linear function of GDP, trade balance, foreign exchange reserves, consumer price index, lending rates, and the index of industrial production, plus an error term. The coefficients of β_i are estimated using the OLS method to minimize the sum of squared residuals between the observed and predicted values of the exchange rate.

RESULTS AND DISCUSSION

Descriptive statistics are in Table 1 and matrix of correlation is in Table 2. Exchange Rate shows strong positive correlations with consumer price index indicating when a country's currency depreciates, the cost of imported goods and services increases, leading to higher overall price levels (CPI). Conversely, an appreciation of the currency makes imports cheaper, reducing the CPI. And also, the exchange rate pass-through effect explains how changes in the exchange rate directly affect domestic prices, particularly for countries heavily reliant on imports. and foreign exchange reserves, moderate positive correlations with gross domestic product and Trade Balance show that a moderate positive relationship between foreign exchange reserves and GDP as well as the trade balance can be understood by looking at various factors such as economic growth, export earnings, investment flows, and effective economic policies. When a country's GDP grows and it has a positive trade balance, this leads to an increase in foreign currency coming into the country and creates a stable economic environment for managing reserves. It is important for policymakers to understand these connections in order to work towards achieving long-term economic growth and stability and a moderate negative correlation with Lending Rates depicts that various factor such as monetary policy, capital flows, inflation, and economic growth.

When lending rates are lower, it usually leads to higher economic activity and attracts foreign investment, which can then increase foreign exchange reserves. However, this relationship is not straightforward and needs to be carefully managed in order to maintain a balance between economic growth, inflation, and financial stability. Policymakers need to understand these dynamics in order to come up with effective strategies to ensure strong foreign exchange reserves while also supporting economic growth.

Consumer price index and foreign exchange reserves also show strong positive correlations with each other and with gross domestic product shows that the strong positive connections between the Consumer Price Index, Foreign Exchange Reserves, and Gross Domestic Product can be attributed to how economic growth, inflation, and foreign currency management are closely linked. When the economy grows, it leads to increased demand and higher prices (CPI), as well as more export earnings and investment, which result in greater foreign exchange reserves. These reserves then help to maintain economic stability and drive further growth, creating a self-reinforcing cycle. Understanding these relationships is important for developing economic policies that encourage sustainable growth and stability.

Industrial Production has a weak negative correlation with ER and FER Lending Rates have moderate negative correlations with exchange rate, consumer price index, and foreign exchange reserves. The weak negative correlation between industrial production and exchange rates/foreign exchange reserves, as well as the moderate negative correlations between lending rates and exchange rates, consumer price index (CPI), and foreign exchange reserves, can be attributed to the interaction of factors such as competitiveness, the cost of borrowing, investment flows, and economic policies. By understanding these relationships, policymakers can develop effective economic strategies that promote balanced growth, manage inflation, and ensure financial stability.

Variables	Mean	Std. Dev.	Min	Max	p1	p99	Skew.	Kurt.
Log Exchange Rate (ER)	3.992	.199	3.722	4.305	3.722	4.305	.315	1.509
Log Real GDP (GDP)	15.97	.392	15.327	16.525	15.327	16.525	-.129	1.743
Log IIP (IIP)	4.48	.185	4.156	4.82	4.156	4.82	-.061	1.842
Log CPI (CPI)	6.37	.438	5.733	6.98	5.733	6.98	-.136	1.49
Log Foreign Exchange Reserve (FER)	14.159	.791	12.484	15.341	12.484	15.341	-.481	2.438
Log Lending Rates (LR)	2.267	.172	1.879	2.506	1.879	2.506	-.641	2.488
Log Trade Balance (TB)	11.705	.944	9.938	13.384	9.938	13.384	.007	2.317

(Source: Author's own compilation in Eviews 12)

Table-1: Descriptive Statistics

Variables	1	2	3	4	5	6	7
(1) ln (ER)	1						
(2) ln (CPI)	0.947	1					
(3) ln (IIP)	-0.374	-0.389	1				
(4) ln (FER)	0.915	0.958	-0.477	1			
(5) ln (TB)	0.464	0.45	-0.262	0.589	1		
(6) ln (GDP)	0.93	0.987	-0.466	0.96	0.455	1	
(7) ln (LR)	-0.822	-0.808	0.379	-0.813	-0.415	-0.816	1

(Source: Author's own compilation in Eviews 12)

Table 2: Matrix of correlation

We assessed the stationarity of all variables using the ADF (Augmented Dickey-Fuller) test. The results indicated that, at the level, all variables except TB had p-values greater than 0.05 (see Table 3). However, at the first difference, all variables were found to be stationary, as their p-values were less than 0.05.

Variable	p-value at level	p-value at first difference
ln (ER)	0.9798	0.0341
ln (GDP)	1.0000	0.0049
ln (IIP)	0.1337	0.0023
ln (CPI)	0.6080	0.0223
ln (FER)	0.9860	0.0081
ln (LR)	0.6109	0.0035
ln (TB)	0.0168	0.0023

(Source: Author's own compilation in Eviews 12)

Table 3: Augmented Dickey-Fuller Test

Variable	Coefficient	Standard Error	t-statistic	Probability
ln (GDP)	-.234	.263	-0.89	.392
ln (IIP)	-.125	.112	-1.12	.286
ln (CPI)	1.027	.231	4.44	.001
ln (FER)	-.318	.107	-2.97	.013
ln (LR)	-.175	.197	-0.89	.394
ln (TB)	.063	.032	1.96	.076

Constant	5.917	2.968	1.99	.072
Mean dependent variance	3.984	**SD dependent var**	0.204	
R-squared	0.933	**Number of observations**	18	
F-test	68.156	**Probability > F**	0.000	
Akaike criterion (AIC)	-41.809	**Bayesian criterion (BIC)**	-35.576	

*** $p<0.01$, ** $p<0.05$, * $p<0.10$

(Source: Author's own compilation in Eviews 12)

Table 4: Least Squares Linear Regression

Results of least squares regression are in Table 4. The result of the F-statistic 68.16, represents that the total model is statistically significant with a very high confidence level (p-value = 0.0000). R-squared 0.9331, meaning that 93.31% of the variance in the exchange rate is described by the chosen independent variables.

Root MSE 0.06568, demonstrating the average deviation of the predicted exchange rates from the observed values. Consumer price index and foreign exchange reserves are statistically significant predictors of the exchange rate. Gross domestic product, index of industrial production, lending rates, and trade balance are not statistically significant at the 0.05 level.

A marginal 1% increase in the consumer price index (an indicator of inflation) is associated with approximately a 1.027% increase in the exchange rate. This suggests that higher inflation in India tends to depreciate the Indian Rupee against other currencies. In the Indian context, this could reflect concerns about inflation reducing purchasing power and investor confidence.

A marginal 1% increase in foreign exchange reserves is connected with approximately a 0.318% decrease in the exchange rate. Higher reserves provide a shield against external shocks, instilling confidence in the Indian Rupee and helping to appreciate or stabilize the currency. While the coefficient suggests that a higher GDP might be associated with a lower exchange rate, the relationship is not statistically significant. This indicates that GDP growth alone may not be a strong predictor of the exchange rate in India, possibly due to other overriding economic factors.

The negative coefficient among index of industrial production and exchange rates suggest that higher industrial production might lead to a lower exchange rate under situation if consumption more domestic, otherwise if industries depend on foreign raw material, then it can weaken rupee, but results here show that this effect is not statistically significant because Industrial output changes may not have a direct or strong immediate impact on the currency value.

The results here show negative coefficient indicating that higher lending rates might be associated with a lower exchange rate, suggesting a potential cooling effect on economic activity. However, this relationship is not significant, implying other factors might overshadow the influence of lending rates on the currency. Usually, higher lending rates attack influx of foreign capital and this leads to appreciate the Indian rupee, as demanded more. A positive coefficient implies that a better trade balance (surplus) is associated with a stronger exchange rate, though the result is only marginally significant. This reflects that while trade balances do impact the exchange rate, the effect is not overwhelmingly strong in the short term.

High inflation is a critical issue in India, impacting the cost of living and economic stability. The significant positive relationship with the exchange rate underscores the need for effective inflation control measures to stabilize the currency.

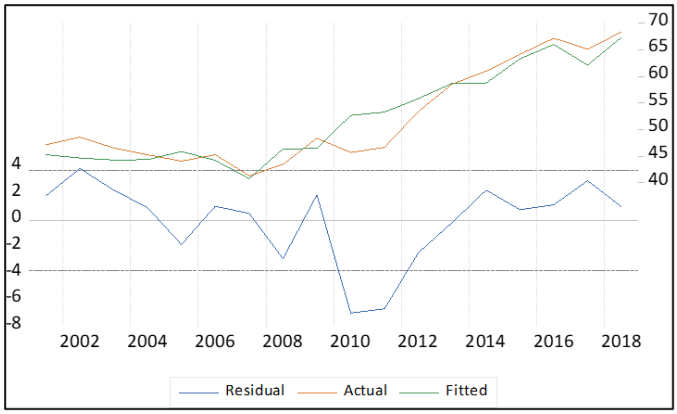

Figure 1: Actual and Fitted Graph

To verify the robustness of our model, we conducted a series of diagnostic tests, including the examination of actual, fitted, and residual graphs, serial correlation tests, heteroskedasticity tests, and CUSUM tests. As illustrated in Figure 1, the fitted values align closely with the actual values, reinforcing the credibility of our model.

Table 5 details the variance inflation factor (VIF) results, which show no presence of multicollinearity in the data. The values in the table indicate that there is no significant correlation among the predictors, meaning the variance of the variables is not inflated. This absence of multicollinearity strengthens the reliability of our model and supports the validity of our results.

Variable	Centered VIF
GDP	1.6194
IIP	1.0981
CPI	2.3703
FER	3.7412
LR	3.6160
TB	1.7872

(Source: Author's own compilation in EViews 12)

Table 5: Variance Inflation Factors

The Breusch-Godfrey Serial Correlation LM test results, as presented in Table 6, show probability values of 0.1159 and 0.0325, both of which are above the 0.05 significance threshold. This indicates that we cannot reject the null hypothesis, which posits the absence of serial correlation in the model. Consequently, we conclude that the model does not suffer from serial correlation issues.

The analysis of serial correlation and heteroskedasticity, summarized in Table 6, confirms the model's robustness, as it is free from these problems. Serial correlation and heteroskedasticity can compromise the validity of a model, but their absence in this case supports the reliability of our findings.

Breusch-Godfrey Serial Correlation Lagrange Multiplier (LM) Test			
Null hypothesis: No serial correlation at up to 3 lags			
F-statistic	2.764845	**Prob. F (2,127)**	0.1159
Obs*R-squared	6.850416	**Prob. Chi-Square (2)**	0.0325
Heteroskedasticity Test: ARCH			
F-statistic	0.147181	**Prob. F (24,113)**	0.9858
Obs*R-squared	1.337665	**Prob. Chi-Square (24)**	0.9695
Scaled explained SS	0.623632	**Prob. Chi-Square (24)**	0.9960

(Source: Author's own compilation in EViews 12)

Table 6: Results of Serial Correlation and Heteroskedasticity Test

The stability of the model is assessed using the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) tests. Figures 2 and 3 illustrate that the blue line stays within the upper and lower bounds, marked by the red lines. This indicates that the model remains stable when estimated at lag 2.

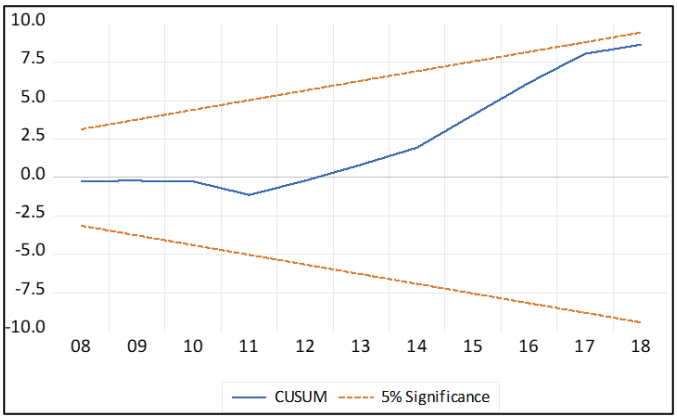

Figure 2: CUSUM Test Results

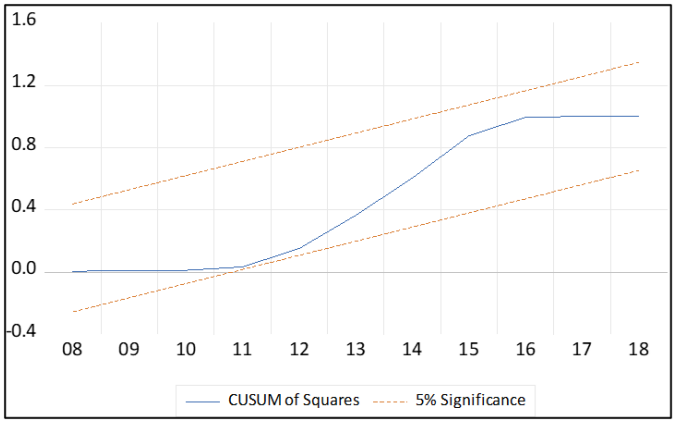

Figure 3: CUSUM of Square Test

CONCLUDING REMARKS

During the period from 2001 to 2018, India's economic landscape was characterized by complex interactions among various macroeconomic variables. The exchange rate showed strong positive correlations with the Consumer Price Index (CPI) and foreign exchange reserves (FER), moderate positive correlations with Gross Domestic Product (GDP) and trade balance, and moderate negative correlations with lending rates. The study identified CPI and FER as statistically significant predictors of the exchange rate. Higher inflation tends to depreciate the Indian Rupee (INR), underscoring the importance of robust inflation control measures. On the other hand, increased foreign exchange reserves enhance currency stability and boost investor confidence.

Although GDP growth, industrial production, and lending rates exhibited the expected directional impacts on the exchange rate, their relationships were not statistically significant, suggesting the presence of other overriding factors. The findings indicate that effective management of inflation and foreign reserves is essential for maintaining currency stability and promoting economic growth. Policymakers must consider these dynamics when formulating economic strategies to ensure long-term stability and development. As India continues to emerge as a major global economy, understanding these interactions will be crucial for navigating future economic challenges.

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